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OF

NATURAL HISTORY

AND

JOURNAL FOR RECORDING FACTS & ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, ANNELIDES,
INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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into the river Barrow, are famous for their excellent trout; the former, a lively stream, rapid over clean gravelly beds, produces abundance of bright and well-fed trout. Although the day was in every way unsuited to the wishes of a fly-fisher, we, however, soon obtained the object of our search. Many years have passed since my former visits, but there was the same purpling restless stream, the banks, the untopped wall leading to the old bridge, unchanged and untouched as it were but yesterday. Carlow is delightfully rural; its avenue-like roads, bordered with tall fragrant hawthorn, made us buoyantly feel the change from city life. Besides, to the naturalist, every step afforded interest—along the banks of the river the Ephemeræ and the Phryganeæ, as they suddenly emerged from the pupa state, almost as suddenly merged into the stomach of some lively trout—the light and the dark ash-fox, brown and gray Coughlins, and the hawthorn flies, as they floated along, or fluttered about the stream, were all the objects of attraction. The question which we sought the elucidation of, was not as to whether salmon do or do not enter the Greece from the Barrow, or whether the shallow beds of that little stream are, or are not, suited for spawning-ground, but with regard to the distinctive characters of the parr existing there, its comparison with that described in Yarrell, and with that of the true salmon-fry. The local terms, lasprings, gravel-lasprings, salmon-pink, fingerlings, gravellings, parr, and samlet, have all been made of too general application, and no proper separation has been drawn to distinguish habits or characteristics, but to confound all as gravellings, and gravellings to be the parr, the young of the salmon. My friend Williams had argued that the gravelling that he had obtained in some of the rivers of Cork and of Wicklow, were not the young of the salmon, and so far he was right, for neither were those we obtained in the Greece. These latter were identical with the accurate descriptions given by Yarrell, by Dr. Heysham, and by several authors — the head being of a greenish ash-colour; back and sides above the lateral line dusky, or olivaceous brown, marked with numerous dark spots, bordering the lateral line a series of carmine or vermilion-coloured spots; belly silvery white, and the body marked with nine or ten bluish-coloured transverse bars; gill-covers have generally two dark-coloured spots, one more strongly marked than the other; dorsal fin with a few dusky spots; pectoral fins larger than those of the common trout, yellowish white, anal and ventral fins yellowish, caudal fin much forked; body deeper in proportion to its length; general length from four to six inches. Now, on comparing these specimens with those of the true salmon-fry, obtained from the Bandon, Laune, and the Caragh rivers, we find great distinction of development and markings. In the true salmon-fry, the head more blunt; broader on the neck and shoulders; gill-covers marked similar with spots silvery gray; preoperculum much rounded; external edge soft; back dusky ash-colour, with numerous minute dark spots, which do not go beneath the lateral line; nine bright orange, or approaching to vermilion-coloured spots along the lateral line, equalling in number the transverse bars; pectoral fins long in proportion, yellowish white, tinged with black dusky spots, generally absent in the dorsal fin; caudal fin largely developed; ventral and anal fins yellowish white; belly white. The body is narrower in proportion to its length than that of the parr, and the teeth in a more rudimentary state. I am not prepared to admit the parr being a distinct species, for it is the young state of the fish, and all the specimens of the Salmonidæ that I have obtained are more or less in the young state characterised by those transverse bars. In the rivers where it frequents the parr is abundant in all seasons, in the same stages of growth; and even when the memorable floods of the winter of 1840 were supposed to cause the scarcity

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of 1850, the parr was equally abundant. An experienced salmon-fisher, and employed in the salmon-fisheries of the Laune, states that the barred gravellings are to be found there all the year round of the same growth,—that he considers them to be distinct from the true salmon-fry, which is not to be found at the end of May or the month of June of any size, all the full-grown fry having gone to the sea, while those of the season are too small to be noticed. In order to illustrate that confusion might naturally exist with regard to the gravelling, Mr. Andrews exhibited specimens of a series of the following:—Salmon-fry, from the Caragh, Laune, and Bandon rivers; parr, from the Greece, the Bandon and the Caragh; young of the white trout, from the Laune and the Bandon rivers; young of the brown trout, from the Caragh; smolts, with migratory dress, from the Laune river. To all these terms the 'gravelling' were generally applied. A most intelligent friend of Mr. Williams observes, that on the Bandon river he has marked numbers of gravelling, and that afterwards he has taken them as peal. No doubt among them he may have marked the true salmon-fry, and on their return from the sea have taken them as peal, but no proof can be afforded that all marked underwent the same change. A characteristic mark in the young state of the salmon-fry and the brown trout is the yellowish gray colour of the adipose fin of the former, while in the latter it is tinged and tipped with bright orange. From these specimens exhibited, and from some of the foregoing remarks, a question would arise as to the several states of growth and age of the fry and smolts. To Mr. Shaw, of Drumlanrig, undoubtedly belongs the merit of determining the true state of the fry from the ova; but still his observations have not all been satisfactorily conclusive. The trials and experiments of development carried on artificially in ponds and in tanks may, to a certain extent, illustrate extrication from the ova and changes of the fry state; but to the habits of an animal peculiarly sensitive through those changes of growth, that growth must be more or less retarded by the deprivation of its natural acts and resources. Mr. Shaw successfully proved the experiment with regard to the character of the fry by taking them direct from the spawning-beds of the salmon; and to him much is due for so perseveringly pursuing such well-directed inquires, and to the shame of preceding naturalists, who ought to have sifted what really was the young state and habits of a fish of such importance in the economy of our industrial resources. His experiments only so far prove what really are the young of the salmon, not that all young states of the Salmonidæ, named parr or gravelling, are the young of the salmon. In his treatise, 'Experimental Observations on the Growth of Salmon Fry,' Mr. Shaw mentions, at page 4, 'that after the so-called smolts have descended to the sea, none of the larger can be detected in the rivers.' The idea that the male parr consorts with the female salmon is too delusive to be supported. What attainable object is advanced by such a departure from all natural laws? That the ova and the milt in a rudimentary state may be detected in the young stages of the true salmon-fry I do not deny; but that the female salmon, which is incapable of the fecundating development of the ova until after the third year of existence and first return and enlarged growth from the sea, can be impregnated by the male of the fry, which had not visited the sea nor undergone those changes necessary for mature growth, appears contrary to all physiological principles. It is true that parr, gravelling and small trout, on the spawning-beds of the salmon, during the periods of spawning, may constantly be noticed, for such shoals of the river are their proper locality. O'Gorman, who wrote 'The Practice of Angling in Ireland,' a most experienced salmon-fisher, and who now enjoys a fine old age in the town of Ennis, could never be persuaded of the parr state of the salmon, but that all the young retreated to the sea the first season of their existence. My own observations and inquiries would lead me to consider that from the period of the extrication of the fry from the ova to the change to its smolt or migratory state would be about 13 or 14 months. In some rivers the fry are in a more advanced state in the winter and spring months than in others, that is, undergoing earlier extrication from the ova, according to the temperature of localities or to early or late breeding fish. Hence the varied growth throughout the summer and autumn; and I further consider that the great bulk of these assume the migratory state in the following spring, descending early in April and May to the sea. That they assume the silvery scales and full migratory dress in the higher portions of the river, before their movement to the sea, I have frequently detected. Referring to my notes, I find that some years since, when fishing in the county of Clare, about the first week in May, in company with the late James o'Gorman, I met the salmon-fry in abundance, with the silvery scales or migratory coat, in that part of the Cooraclare river between the bridges of Ballydoneen and Goulbourne. Some dozens were taken in a part of the stream that ran rapidly over a rocky and gravelly bed which high banks overhung. It was close to a spawning-bed of the salmon. These fish had perfectly assumed the silvery scales of the smolt, tapering in form, and with pectoral and caudal fins largely developed, the terminal parts tinged with a dark shade. Subsequent observations and application to the subject influenced me to consider that they were the young of the ova of the previous year, and that they had only attained their 13th or 14th month, their migration to the sea being between the 11th and 14th month from the period of extrication from the ova. The river of Cooraclare, which assumes the name of Dunbeg, where it falls into the Atlantic Ocean, in the little estuary of that name, is famous for its salmon. In August, 1835, I saw in one haul 104 salmon and 200 white trout, taken by Michael Kennedy from the lake below the bridge and fall, under Dunbeg Castle. The rivers Creegh, Annageeragh, and Annagh, which I have fished, are all excellent in their seasons for salmon and white trout. In the little river of Monmore, which runs through the great bog of that name, salmon and white trout run up the stream in the autumn floods, but I never recollect meeting the gravelling there with the markings and bright hue of the parr. It is not my intention now to enter into a statement of the salmon-fisheries, but merely to refer to some of the observations made by Mr. Ffennell in this Society. At the meeting in April, Mr. Ffennell mentioned that at the approach of the spawning-season the male salmon invariably first ascend the rivers from the sea. It is singular that authors have given the precedence to the females, both to the salmon and to the trout. Allowing either the priority, experience has shown that the parent fish are on the spawning-beds together, each occasionally engaged, but more especially the female, in the excavation of the furrow or channel where the ova are to be deposited, and in this labour their principal exertions are snouting the gravel. The clear and shoaler beds of a river, where it is necessary for the salmon to select the deposit-beds for the due maturating of the ova, can be quietly watched and all their operations noticed. In the Wandle Mr. Gurney has seen the large trout raise ridges of gravel, and has remarked their noses or snouts to be lacerated by the work. The romantic history of Remy, the fisherman of the Vosges, pursuing his patient watchings on the habits of the trout, in the bleak nights of November, and which reflect lustre on his powers of observation, is pleasingly told. No such endurance is necessary to mark the operations of the parent salmon. Some have observed that the hook of the male salmon serves some purpose in the spawning operations. This curvature of the under jaw is peculiar both to the male salmon and the trout, and which is more or less developed according to age or state of health of the fish. On the ascent from the sea the hook is merely observable, but after the exhaustion of spawning the reduced condition of the fish renders it more conspicuous; and should obstacles prevent the proper period of return to the sea, a cartilaginous extension takes place (whence it is called Carraughabaugh), but which disappears on the renewed health of the fish, in its visit to the sea. In aged fish, particularly in large trout, this curvature becomes permanent in its enlargement, forming a deep fossette in the upper jaw. Without a good foundation of scientific and practical knowledge combined in the pursuits of such subjects, it is a task of great difficulty to select with judgment the plausible opinions that are frequently advanced by writers of known character, but who at the time perhaps only possess general views of the matter of which they treat. Thus, Mr. Keiller, in 'Lloyd's Scandinavian Adventures,' states the habits of the salmon of the Save, in Norway, to be such as are altogether different from that of the British Isles; forming no channel for the deposit of the ova, but allowing them to float down the stream, impregnated by the milt, similarly floating, and, finally, whatever escapes the rapacity of the river fish settles in some crevice or rock until the fry is excluded. This is so contrary to the natural principles of the family of the true salmons as scarcely to be worthy of dependence; for, more probably, the floating ova that escaped the maws of hungry trout would settle in some quiet pool beyond the medium of maturation, and finally perish. In fact, it is characteristic of the Clupeidæ or herring family, which, in the spawning-seasons, seek the inlets and shallows of our shores, where the excluded ova, in myriads, float away at the mercy of the tides; besides, a far greater distinction exists in the specific gravity of the ova of the salmon, the trout, and the herring—those of the former, the greater portion sink at once to the bed or furrow, where they are impregnated by the male, and remain without removal. In the Clupeidæ, expulsion of the ova in masses spread far, and float a considerable time, even where no force of tide or wave would drive. We know of that family that the shad—both Alosa finta and Alosa communis—ascend in the early part of summer from the sea to the fresh water to spawn; but they seek the sluggish parts of a river, or the quiet waters of the lake, where the ova float, to be impregnated, similar in habit to the herring. The shad has been taken in salmon-nets in the lakes at Killarney, and in rivers in Kerry. Some discussion also arose in the Society that the clean spring fish ascending the Caragh river, in the county Kerry, in January, remained in the fresh water throughout the summer, and spawned the following autumn without revisiting the sea before spawning. It is necessary, for the proper development of the ova and milt, that the fish should be in the healthiest state of vigour; consequently a sojourn in the fresh water for so many months must greatly deteriorate the condition of the fish, and render them unequal to such important functions. The wild and romantic districts in Kerry, which supply the waters of the Laune and the Caragh, have for years been familiar to me. Its salmon-fisheries, therefore, would naturally interest me. Salmon are found ascending the Caragh very early in the autumn for the spawning-beds, being at that time, in August and early in September, with the ova largely developed. These are the early breeding fish, and subsequently are the run of early spring salmon. After the operations are completed in the spawning-beds, the fish return to the sea to recruit, and are again to be met early in January, in the fresh water, in the primest condition. These fish do not then visit the river or lake for the purpose of spawning, nor remain until that time approaches, for salmon do not at all times enter the rivers for the object of breeding. Seasons and localities alone influence the salmon to proceed to the spawning-beds, according to the condition of the early and late breeding fish. Mr. Shaw's experiment proves that the salmon which he captured for the purpose of obtaining the ova for artificial impregnation, and placed in ponds after he had successfully effected the object, on being liberated from the ponds at once moved towards the sea. Frequent remarks have been advanced, that to the destructive floods of 1848 and 1849 were to be attributed the scarcity of salmon the following years. I was on the South-west coast in the season of 1849 and 1850. Our salmon-fisheries in the Feohanagh and the Clehane were complete failures in 1850, and there certainly was a scarcity of peal that season. Our western rivers are very late, and salmon do not in the generality of them approach until late in the season. After the season had closed the salmon were plentiful in the estuaries, and this was strikingly the case late in the season of 1850, for great quantities of fish were hanging about the mouths of the rivers, unable or uninclined to ascend until very late in the season. The season of that year was uncommonly dry, and the rivers were low the greater part of the autumn; and it was not until October that the fish entered the rivers. At that time I heard that those that were taken were in prime condition. On inquiries the same season I found that similar causes to some extent affected the Lee and the Slaney, and that long after the season had closed the salmon were to be found going up the rivers, and in prime condition. This went far to prove that in some of those late rivers the season closes much too early (at least for the rod), and on the other hand the season should not commence too early. Again, there are exceptions, for in some rivers there is a good run of clean fish the greater part of the year. It is quite clear that salmon do not desert the rivers of their origin, for whatever natural causes may induce or oppose their earlier or later ascent from the sea, they invariably seek the parent stream. Their visits to the sea are confined to those depths off the coast where the river disembogues, and where rocky ledges and sandy and shingly channels afford protection, and abundance of marine animals for the proper nourishment of their rapid growth. Experience has proved to me the unsound views advanced of the migration of fish. Cod, ling, haddock, hake, pollock and herrings are throughout the year in the deep water, their proper feeding-grounds bordering the parts of the coast, and the bays and estuaries, where they each season approach to spawn. All oviparous fish visit the shoaler parts of a coast to spawn, and those periods are now the seasons of the fishermen's harvest. An experimental cruise in 1850 proved the correctness of these views. On proper sounding-grounds off the coast the finest ling and cod were taken long after the usual season was over, thus fully bearing out the statements that had been made to the late Admiral Sir Thomas Ussher and to the Earl of Clarendon. My friend James Edw. Stopford, Esq., in connexion with the Royal Irish Fisheries Company, is now on the South-west coast working out more extensively these trials. In these inquiries it is difficult to overcome the prejudices and habits of the coast fishermen: educated only in the knowledge of their fathers, they are hostile to any innovation of that knowledge, and therefore cannot comprehend the views of the practical naturalist, to learn accurately the nature of the soundings, the marine animals, the characteristics of and distribution of fish, which all tend to arrive at information so necessary with regard to the feeding, the spawning-grounds, and the habits of animals connected with so important a branch of resource. In concluding, these observations must only be considered general, as it is my intention to enter more minutely into the distinctive details that characterise the Salmonidæ. I have to regret, however, the absence of Mr. Ffennell, whose able assistance would have been valuable on this subject, which he had started in the Society and invited it to the discussion. It is a subject also that requires the aid of the sound judgment of the practical men of the great Scotch fisheries."

The Chairman said that the salmon-fisheries of Ireland had for some years past excited great and general interest, yet it was a subject that appeared not to have been understood. He would be glad to hear any remarks from the Members upon the statements which Mr. Andrews had submitted.

Wheatears feeding on Flies; &c.

Doctor Farran wished to offer a few observations prior to the adjournment of the Society for the summer recess. Ornithological facts, with the exception of Mr. Andrews' highly interesting paper on the membranaceous duck of Australia, had occupied the attention of the Society very briefly during the late meetings; but he trusted a large accumulation of such would be in store for the ensuing session. He thought the following notes might prove interesting:—Walking on the shore of Knockaginn, on the 3rd of April, 1854, he (Dr. Farran) saw eight or ten male wheatears (*Saxicola Œnanthe*), in fine plumage, sitting on a little eminence or sand-hill. It being a fine sun-shining day flies were abundantly about, on which the wheatears were feeding in the manner of the flycatchers, capturing the insect on the wing, and immediately returning to the spot they left. They appeared fearless, suffering you to approach within five yards, and remaining motionless until attracted by their prey. It would appear, from such a number of male birds being together, that they preceded the females in their migration. Another fact was the almost total disappearance of the brent goose (*Anser Brenta*) from the Dublin markets. This bird, erroneously named bernicle, has hitherto been abundant, and much esteemed for its flavour. The winter was very severe, which usually brings them in numbers to our shores. The cause of their disappearance should be inquired into.

Honorary Members.

The Chairman then announced that the ballot should take place. There were the names of some distinguished men that had been approved of by the Council to be nominated Honorary Members. He should mention that it was a rule of the Society that "No person residing in Dublin, or within ten miles of it, can be elected as an Honorary Member of the Society."

Annual Dinner.

Mr. Andrews, one of the Secretaries, then stated that this meeting closed the session for the season. The Society in its objects had endeavoured, throughout the past session, to bring before its meetings subjects, original, useful and instructive, and more especially of value in practical points. The mere collecting of the objects of the natural history of a country, or the records of their existence, are but limited stages in the advance of the science; our powers should be bent to trace causes of existence, and the results useful and practical derivable from such causes. He trusted that during the recess the Members would aid these objects of the Society. He also mentioned that it was proposed that the usual annual dinner should take place, of which due notice would be given to the Members.

Election of Members.

The Chairman then announced that the following gentlemen had been unanimously elected Honorary Members:—Colonel Sabine, F.R.S., President of the British Association; Thomas Bell, Esq., F.R.S., President of the Linnean Society; Sir William Jackson Hooker, K.H., &c., Director of the Royal Botanic Gardens, Kew; Edward Newman, Esq., President of the Entomological Society; J. O. Westwood, Esq., Ex-President of the Entomological Society; Joshua Alder, Esq.; and — Martin, Esq., Dublin, Ordinary Member.

The session was then adjourned to November.

Proceedings of Natural-History Collectors in Foreign Countries.

MR. A. R. WALLACE.—"Singapore, May 9, 1854.—As I have no doubt that my entomological friends will be glad to hear that I have arrived safe, and have commenced work, I will give you a short account of my progress up to this time.

"I landed at Singapore on the 20th of April, after a 46 days' passage from England without any incident out of the common. For a week I was obliged to remain in the town at an hotel, not finding it easy to obtain any residence or lodging in the country. During this time I examined the suburbs, and soon came to the conclusion that it was impossible to do anything there in the way of insects, for the virgin forests have been entirely cleared away for four or five miles round (scarcely a tree being left), and plantations of nutmeg and Oreca palm have been formed. These are intersected by straight and dusty roads; and waste places are covered with a vegetation of shrubby Melastonias, which do not seem attractive to insects. A few species of Terias, Cethosia, Danais and Euplœa, with some obscure Satyridæ, are the only butterflies seen, while two or three lamellicorn beetles on the Acacia trees were the only Coleoptera that I could meet with.

"At length, however, I obtained permission to reside a few weeks at a Roman Catholic mission near the centre of the island, from which place, called 'Bakit Tima,' I now write. Here portions of the forest, which originally covered the whole island, and which is rapidly disappearing, still exists, and it is in them that I find my only good hunting-grounds.

"From the highest point in the island near here (only 500 feet) a good view is obtained of the plantations which are everywhere formed by the Chinese for the cultivation of pepper and gambic; and it is apparent that but few years can elapse before the whole island will be denuded of its indigenous vegetation, when its climate will no doubt be materially altered (probably for the worse), and countless tribes of interesting insects become extinct. I am therefore working hard at the insects alone for the present, and will give you some little notion of what I have done and may hope to do.

"First, then, in Lepidoptera I have been tolerably successful, having in about twelve days obtained 80 species of Diurnes. If other localities prove equally rich I think the Eastern Archipelago may not fall much short of S. America. I have already about 30 species of Lycænidæ and Ericinidæ, some of which I have no doubt will prove new. Among the larger species the most remarkable is a magnificent Idæa, which is abundant in the forest, sailing or rather floating along, and having to my eye a far more striking and majestic appearance than even the Morphos of Brazil. It was a great treat to me to behold them for the first time, as well as many other of the Eastern forms to which I had pretty well familiarised my eye in collections at home. The Euplœas here quite take the place of the Heliconidæ of the Amazons, and exactly resemble them in their habits. I have taken the singular Danais Daos, *Doub.*, figured by Boisduval as an Idæa, which it exactly resembles in its colour, markings and flight; indeed there are small specimens of the Idæa from which it cannot be distinguished till captured, yet it is certainly a true Danais. The Leptocercus Curius is not uncommon here; it is a Papilio Protesilaus in miniature. Of true Papilios I have only four common species, and one of the group resembling Euplœa, which may prove new.

"I must now turn to the Coleoptera. I am delighted with them; for though all small at present, they are exceedingly beautiful and interesting. I have 6 species of Cicindelas, all small; 13 Carabidæ, mostly minute, but very beautiful; 10—12 Cleridæ; about 30 very small Curculionidæ; and, *mirabile dictu!* 50 species of Longicornes, and it is only ten days since I took the first. Imagine my delight at taking 8 to 10 a day of this beautiful group, and almost all different species; but the worst of it is that I have got into a place where there are many woodmen and sawyers at work, and it is in the neighbourhood of the fallen timber that I get most of them, on the wing. Almost all are small, few exceeding an inch and many not much more than a line. Under Boleti I have found some extraordinary Erotylidæ.

The Elaters and Buprestidæ are all very small, as well as the Chrysomelidæ and other small groups. In all I have now 250 species, which will increase daily, but at a slower rate.

"In the other orders there is nothing very remarkable. Hemiptera, as well as bees and wasps, are very scarce. Tenthredinidæ are rather abundant. Of dragon-flies I have many pretty species, and the Diptera are plentiful and very curious. I have taken a species (of the genus Diopsis I believe) with telescopic eyes, and some other singular forms. Ants are very abundant, also scorpions and centipedes, but these I do not seek after.

"In the midst of this entomological banquet there is, however, one drawback—a sword suspended by a hair over the head of the unfortunate flycatcher: it is the possibility of being eaten up by a tiger! While watching with eager eyes some lovely insect, the thought will occasionally occur that a hungry tiger may be lurking in that dense jungle immediately behind intent upon catching you. Hundreds of Chinamen are annually devoured. Pitfalls are made for the animals all over the country; and in one of them, within two miles of our house, a tiger was captured a short time before my arrival. Only last night a party of Chinamen, going home to their plantation, turned back afraid, having heard the roaring of a tiger in the path. These are unpleasant reminders of the proximity of a deadly foe; and though perhaps the absolute danger is little enough, as the tiger is a great coward and will not attack unless he can do it unawares, yet it is better to have the mind quite free from any such apprehensions. I shall therefore most probably leave here in a month or so for Borneo, before which, however, I hope to make such a collection as to give a tolerably correct idea of the Entomology of Singapore."

MR. H. W. BATES.*—"Santarem, January 18, 1854.—Although I have no collection to forward this month, and nothing very important to say, I write you to convey my great gratification at the receipt, a few days ago, of the two missing parcels sent by you; not only the one sent in May last, but also the long-lost one of May, 1852, containing the water-colours, &c., &c.; all quite complete and undisturbed: they have been lying at the Custom-House in Parà, on account of no one making application for them. I believe now I have received everything you have sent me up to this time. In December I sent you the collection I had made in a three months' sojourn up the

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* Communicated by Mr. S. Stevens.

Tapajos, &c., and I hear from Parà that it was destined to go in the 'Isabella Scott,' to sail on the 4th of January. Amongst its contents is a large number of new species of all orders, and some very nice series of new and rare species of Erycinidæ. I had indicated a number of sexes paired in the collection; and as far as regards the Lemonias Pythia, and the other plain blue Lemonias, I have since received further confirmation. In my last letter to you I sent notes, and I believe expressed myself disappointed at not receiving some promised sketches and names of my species from our friends; on further reflection, however, I do not see that I have any right to expect it; and moreover, since I received the five Catalogues of the British Museum I find any further assistance from friends by letter quite unnecessary, as far as the departments of which the Catalogues treat. I have lots of curious and I think new observations on the Neuroptera, in almost all the families.

"The rainy season has set in here two months earlier than last year, and with great force: we have deluges of rain. Collecting anywhere else except in the dry campos of Santarem is out of the question: it will very likely clear up earlier, and that will be favourable for ascending the river to Peru. The steamer which struck on a rock in the river, last September, has been freed this week, and will come to Santarem to be repaired: the other steamer will be then disengaged to resume its line on the Upper Amazons to Nanta, and I of course shall take the opportunity. I have just captured several pairs of Pœcilopeplus Batesii *in copulâ*. The female has quite a different shaped thorax, rhomboidal, side-angles produced and shining black, more like Sternacanthus. I have taken here lots of new species of larger things, but have done nothing [illegible] all in minute Coleoptera this season."

M. Julien Deby.*—"Floyd County, United States, March 7, 1854.—You will perhaps have been anxious about me, not having received any tidings of my proceedings since I left Europe, but I will in a very few words explain to you my misfortunes. I was wrecked on the coast of Nova Scotia, losing all my luggage, clothes, money, &c., to the last halfpenny I possessed. I was the only passenger on board the unfortunate ship. I got on to Halifax, where, after working a short time *as gardener*, I collected the necessary sum to take me on to New York, where I hoped to meet some countrymen of mine who might help me in my forlorn condition. When I reached that town, the persons I hoped to meet had left, some for Europe, and those I best knew for Georgia in the South. I immediately wrote to these last, but receiving no answer determined on rejoining them. I now had a hard time of it; I made myself 'Jack of all trades,' so as to collect the money necessary for the journey. I worked at New York, Philadelphia, Baltimore, Norfolk, Wilmington, Charlestown and Augusta, and after many weeks of hard labour, and harder life than I ever experienced in the midst of the South-American forests, I reached Rome, a small town of three thousand inhabitants, and discovered my friends (the Gaussoin family), living twelve miles from there, on a small cotton-plantation. I was received there as a friend. My letter had never reached them; but the position of M. Gaussoin prevented his giving me any pecuniary help, so I determined to stop with him and try and make by my efforts the necessary money to carry me on further South. I am quite determined, as soon as I have the necessary funds, to go on to Central America. I am born for misfortune, I think, but I am not easily discouraged, and am determined to fight the battle of life to the very last, and not to allow myself to be beaten by circumstances. I have been here some weeks now, and in my leisure hours have collected specimens of divers kinds. I am astonished at the richness of the Fauna and Flora of these parts, and have collected many insects which to me seem undescribed. Reptiles (especially Batrachia, as Triton, Salamandra, Rana, and allied genera) and tortoises are very numerous. Do you think I could make some money by insects, reptiles, birds, and land and fresh-water shells? If so, answer me immediately, and I shall set diligently to work. My only aim is making the necessary money to carry me on, and every little helps; small streams make great rivers. I could easily collect four to six thousand insects in a month's time, and a few hundred bird-skins, which the boys would shoot for me, and which I would skin in the evening after the day's work is over.

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* Communicated by Mr. S. Stevens.

"Could you not forward me a few thousand entomological pins? I cannot possibly buy them here. All my provision of them and the insect-boxes I had made so carefully are lost. If you could send them by some vessel coming to Charlestown, you might address them to the Belgian Consul in that town, 'to be given to Mr. Camille Le Hardy.' This gentleman I know, and he will forward them to me. I am here in a fine, hilly, well-watered and very well-wooded country, but the plantations are few and far between; and some good-sized marshes in the midst of the woods are the resort of many rare animals.

I cannot help thinking that collecting here would pay, as very few naturalists, so far as I know, have ever visited this part of Georgia.

"Have MM. Botteri and Hoffman reached their respective destinations safely?—how I envy them.

"Did the reptiles I sent you from Belgium, on the eve of my departure, ever reach you?

"I shall soon write a longer letter, giving you some curious details on what I have observed in the Natural History of this county. I have an opportunity for the post to-day, which I fear losing if I continue writing. I hope you will pity me and my misfortunes. Be assured that as long as there is life in me I shall not lose courage or my passionate love for Natural History."

NOTICES OF NEW BOOKS.

'*The Annals and Magazine of Natural History.*' No. 79, dated July, 1854; *price* 2*s.* 6*d.* London: Taylor & Francis, Red Lion Court, Fleet Street.

This number contains the undermentioned papers:—

'On the Genus Lycium.' By John Miers, Esq., F.R.S., F.L.S., &c.

'Additions and Corrections to the Arrangement of the Families of Bivalve Shells.' By J. E. Gray, Ph.D., F.R.S., V.P.Z.S.

'Supplement to a Catalogue of British Spiders, including Remarks on their Structure, Functions, Œconomy and Systematic Arrangement.' By John Blackwall, F.L.S.

'On the Mechanism of Aquatic Respiration, and on the Structure of the Organs of Breathing in Invertebrate Animals.' By Thomas Williams, M.D. Lond. (With two plates.)

'Notes on the Ornithology of Ceylon, collected during an Eight Years' Residence in the Island.' By Edgar Leopold Layard, F.Z.S., C.M.E.S., &c.

'On Manufactured Sea-Water for the Aquarium.' By P. H. Gosse, A.L.S.

Proceedings of Learned Societies:—Royal—Zoological—Royal Institution.

Miscellaneous:—On the Formation of the Stomata in the Epidermis of the Leaves of the Spiderwort (*Tradescantia virginica*), and on the Evolutions of the Cells in their Neighbourhood; by Dr. Garreau. Description of a New Genus of Bivalve Mollusca; by H. and A. Adams. On the Dimorphism of the Uredineæ; by M. Tulasne.

Mr. Gosse's suggestion for making a substitute for sea-water will be found useful, on account of the expense and trouble it must necessarily save. Impressed with the difficulties attending the usual method of supply, he says, "I determined to try the matter for myself. I took Schweitzer's analysis, but as I found that there was some slight difference between his and Laurent's, I concluded that a minute accuracy was not indispensable. Schweitzer gives the following analysis of 1000 grains of sea-water taken off Brighton:—

Water	964·744
Chloride of sodium	27·059
Chloride of magnesium . . .	3·666
Chloride of potassium	0·765
Bromide of magnesium . . .	0·029
Sulphate of magnesia	2·295
Sulphate of lime	1·407
Carbonate of lime	0·033
	999·998

"The bromide of magnesium and the carbonate of lime I thought I might neglect, from the minuteness of their quantities; as also because the former was not found at all by M. Laurent in the waters of the Mediterranean; and the latter might be found in sufficient abundance in the fragments of shell, coral, and calcareous Algæ, thrown in to make the bottom of the aquarium. The sulphate of lime (plaster of Paris) also I ventured to eliminate, on account of its extreme insolubility, and because M. Laurent finds it in excessively minute quantity. The component salts were then reduced to four, which I used in the following quantities:—

Common table salt . . .	3½ ounces.
Epsom salts	¼ ounce.
Chloride of magnesium . .	200 grains, Troy.
Chloride of potassium . . .	40 „ „

To these salts, thrown into a jar, a little less than four quarts of water (New River) were added, so that the solution was of that density that a specific gravity bubble 1026 would just sink in it.

"The cost of the substances was—sulph. mag., 1*d.*; chloride mag., 3*d.*; chlor. pot., 1¼*d.*; salt, nil; total 5¼*d.* per gallon. Of course if a larger quantity were made the cost of the materials would be diminished, so that we may set down 5*d.* per gallon as the maximum cost of sea-water thus made. The trouble is nothing, and no professional skill is requisite.

"My manufacture was made on the 21st of April. The following day I poured off about half the quantity made (filtering it through a sponge in a glass funnel) into a confectioner's show-glass. I put in a bottom of small shore pebbles, well washed in fresh water, and one or two fragments of stone with fronds of green sea-weed (*Ulva latissima*) growing thereon. I would not at once venture upon the admission of animals, as I wished the water to be somewhat impregnated with the scattered spores of the Ulva; and I thought that if any subtle elements were thrown off from growing vegetables, the water should have the advantage of it before the entrance of animal life. This, too, is the order of nature; plants first; then animals."

'*Transactions of the Entomological Society of London.*' New Series. Vol. III., Part 1. Demy 8vo., 56 pp. letter-press; 3 plates. *Price* 3*s.* 6*d.* London: Longman. 1854.

The papers in this part are intituled—

'Notice of a Sack-bearing Bombyx, found by Mr. Bates near Santarem, in the Amazons.' By Edward Newman, Imp. L. C. Acad. Memb., F.L.S., &c.

'Description of a New Species of Lithocolletis.' By John Scott, Esq.

'Critical Remarks upon the British Elateridæ, with Descriptions of some of the Species.' By John Curtis, Esq., F.L.S., &c.

'Some Observations on the Excrement of Insects; in a Letter addressed to William Spence, Esq., F.R.S., &c.' By John Davy, M.D., F.R.S., Inspector-General of Army Hospitals.

'Descriptions of some Coleopterous Larvæ, &c.' By John Curtis, Esq., F.L.S., &c.

'Observations on the Economy of Pompilus punctum and other Hymenoptera.' By F. Smith, Esq.

'Descriptions of a New Species of Ichneumon.' By Thomas Desvignes, Esq.

'Characters of undescribed Lucanidæ, collected in China, by R. Fortune, Esq.' By W. Wilson Saunders, Esq., &c.

'*Transactions of the Tyneside Naturalists' Field Club.*' Vol. II., Part 3. Demy 8vo., 38 pp. London: Simpkin. 1853.

The papers in this part are intituled—

'Address to the Members of the Tyneside Naturalists' Field Club.' By the President, Dr. Thorp, Archdeacon of Durham, &c.

'Journal of an Excursion into Northumberland, in June and July, 1851.' By James Hardy.

'Observations on the Nidification of Gasterosteus aculeatus and Gasterosteus spinachia.' By Albany Hancock.

'Notes on the Fifth Field Meeting, held at Otterburn, on the 2nd and 3rd of September, 1852.' By William Kell, Esq., F.A.S.

The paper of most general interest, that on the nidification of Gasterosteus aculeatus, we have transferred to the 'Zoologist:' the writer should, we think, have referred to Mr. R. Q. Couch's admirable and minutely accurate paper on the same subject in the 'Zoologist,' published in 1844 (Zool. 795). The passage commencing "On several occasions" and ending at "as long as I remained" is a *verbatim* and *literatim* reprint from the 'Zoologist.'

'*Shells and their Inhabitants. The Genera of Recent Mollusca arranged according to their Organization.*' By Henry and Arthur Adams. Parts XI.—XIV. London: Van Voorst. March —June, 1854. Each Part contains 32 pages of letter-press and 4 plates; price 2*s.* 6*d.* Demy 8vo. plain, 5*s.* Royal 8vo. coloured.

Part XI. comprises the following genera:—Planaxis, *Lamarck;* Quoyia, *Deshayes;* Holcostoma, *H. and A. Adams;* Litiopa, *Rang;* Rissoella, *Gray;* Hyala, *H. and A. Adams;* Rissoina, *D'Orbigny;* Rissoa, *Fréminville;* Alvania, *Risso;* Onoba, *H. and A. Adams;* Barleeia, *Clark;* Ceratia, *H. and A. Adams;* Setia, *H. and A. Adams;* Cingula, *Fleming;* Hydrobia, *Hartmann;* Amnicola, *Gould and Haldeman;* Vivipara, *Lamarck;* Paludomus, *Swainson;* Tanalia, *Gray;* Bithynia, *Leach;* Nematura, *Benson;* Valvata, *O. F. Müller;* Ampullaria, *Lamarck;* Pomus, *Humphrey;* Marisa, *Gray;* Pomella, *Gray;* Lanistes, *Montfort;* Meladomus, *Swainson;* Asolene, *D'Orbigny;* Turritella, *Lamarck;* and Torcula, *Gray.*

Part XII. comprises the following genera: — Zaria, Mesalia and Eglisia, *Gray;* Cæcum, *Fleming;* Siphonium, *Browne;* Vermetus, *Adanson;* Bivonia, *Gray;* Serpulorbis, *Sassi;* Cladopoda, *Gray;* Spiroglyphus, *Daudin;* Tenagoda, *Guettard;* Onustus, *Humphrey;* Xenophora, *Fischer;* Calyptra, *Humphrey;* Crucibulum and Trochita, *Schumacher;* Galerus and Crypta, *Humphrey;* Capulus, *Montfort;* Amathina, *Gray;* Cochlolepas, *Klein;* Vanikoro, *Quoy & Gaimard;* Neritopsis, *Grateloupe;* Nerita, *Linneus;* Neritella, *Humphrey;* and Clithon, *Montfort.*

Part XIII. comprises the following genera:—Catillus, *Humphrey;* Eutropia, *Humphrey;* Turbo, *Linneus;* Senectus, *Humphrey;* Lunella, *Bolten;* Modelia, *Gray;* Prisogaster, *Mörch;* Callopoma, Ninella and Collonia, *Gray;* Astralium, *Link;* Stella, *Klein;* Guildfordia, Uvanilla, Pachypoma, Lithopoma and Pomaulax, *Gray;* Cookia, *Lesson;* Bolma, *Risso;* Liotia, *Gray;* Cyclostrema, *Marryatt;* Adeorbis, *Searles Wood;* Umbonium, *Link;* Isanda, *H. and A. Adams;* Camitia, *Gray;* Chrysostoma, *Swainson;* Angaria, *Bolten;* Livona, *Gray;* Trochus, *Linneus;* Cardinalia, *Gray;* Tectus, *Montfort;* Polydonta, *Schumacher;* and Clanculus, *Montfort.*

Part XIV. comprises the following genera:—Crospedotus, *Philippi;* Monodonta, *Lamarck;* Euchelus and Diloma, *Philippi;* Thalotia, *Gray;* Ziziphinus, *Leach;* Turcica, *H. and A. Adams;* Cantharidus, *Montfort;* Eleuchus, *Humphrey;* Bankivia, *Beck;* Trochocochlea, *Klein;* Oxystele, *Philippi;* Photinula, *H. and A. Adams;* Chlorostoma, *Swainson;* Omphalius, *Philippi;* Monilea, *Swainson;* Gibbula, *Leach;* Trochiscus, *Sowerby;* Margarita, *Leach;* Vitrinella, *C. B. Adams;* Stomatella, *Lamarck;* Stomatia, *Helbling;* Microtis, *A. Adams;* Gena, *Gray;* Broderipia, *Gray;* Anatomus, *Montfort;* Haliotis, *Linneus;* Teinotis, *H. and A. Adams;* Padollus, *Montfort;* Fissurella, *Bruguière;* Lucapina, *Gray;* and Clypidella, *Swainson.*

'*A Manual of Natural History, for the use of Travellers; being a Description of the Families of the Animal and Vegetable Kingdoms: with Remarks on the practical study of Geology and Meteorology. To which are appended Directions for Collecting and Preserving.*' By ARTHUR ADAMS, M.R.C.S.; F.L.S.; M.E.S., Stettin; WILLIAM BALFOUR BAIKIE, M.D., F.B.S.E., late one of the Presidents of the Royal Medical Society of Edinburgh; and CHARLES BARRON, Curator of the Royal Naval Museum at Haslar. London: John Van Voorst, Paternoster Row. 1854. Post 8vo; 750 pages. Price 12*s*.

We cannot better give the view which the authors have in publishing this work than in citing their preface entire.

"The design of the following pages is to endeavour to supply what seems to be a blank in the scientific literature of this country, for, although numerous treatises exist upon every branch, yet no work has hitherto appeared, comprising either succinctly or in detail, a comprehensive outline of Natural History. It may appear presumptuous on the part of the Authors to attempt to grapple with such an extensive range of subjects, which they feel must be, in many instances, inadequately treated, still they trust that their effort to condense, within the limits of a portable volume, the leading features of Animate and Inanimate Nature, may prove of service to those at least for whom it is more especially intended. Their chief aim has been to render their work at once sufficiently popular for the general reader, without, at the same time, lessening its scientific value. For this purpose technicalities have been avoided whenever their employment could be dispensed with, English names have been given to all the Classes, Orders, and Families, and the principal divisions have been prefaced by brief introductory remarks. The classification adopted is that which has seemed most closely to accord with the advanced views of the time; and throughout the Animal and Vegetable Kingdoms a uniform system has been employed, so that similar subdivisions are designated by a cognate nomenclature."

'*The Microscope and its Application to Clinical Medicine.*' By LIONEL BEALE, M.B. Lond., Professor of Physiology and Morbid Anatomy in King's College, London. Post 8vo, 304 pp. letter-press, 1 plate, and numerous illustrations on wood. *Price* 10*s.* 6*d.* London: Highley, 1854.

We think this a useful book, but not perhaps exactly in our peculiar department of science. "A short course of lectures which was given in the Spring of 1853 forms the basis of the volume. To the notes, which had been prepared, and which the author had originally intended to print for the use of his pupils, much has since been added; and it is hoped that in its present shape the work may afford some assistance to practitioners and students in medicine who employ the microscope in clinical investigation or in physiological and pathological inquiries.

"In the present day this branch of investigation is being pursued by all who are most anxious to increase our knowledge of the structural alterations taking place in disease, and of adding to our information with reference to some of those important processes which interfere with the due performance of the healthy functions of different organs—investigations in which all may find ample employment, and may thus contribute to the advancement of the true interests of their profession, and aid in the elucidation of truths which may ultimately promote the interests and welfare of mankind in a degree not less than they will add to the advancement of science."—*Preface.*

So writes the author: we have only to add that we heartily recommend the book as one of the careful essays that always benefit that branch of science of which they particularly relate.

Reply to Mr. Birkbeck's "Remarks on a List of Birds of West Cumberland," by Mr. Joseph Robson, addressed to Walter Buchanan, Esq., F.L.S.—In the 'Zoologist,' (Zool. 4366), I observe you are expected to answer a few inquiries respecting some extraordinary statements in "A List of the Birds of West Cumberland," (Zool. 4166). As the list was compiled by me, from, I fully believe, most authentic sources of information, I will feel obliged if you will communicate to Mr. Birkbeck, through the 'Zoologist,' the following statement, which I have no doubt may be relied upon.

Swallow-tailed Kite (*Elanus furcatus*), shot in Eskdale, Cumberland, spring of 1853.

Description.—For details see Yarrell.

Time of capture.—April; exact date not known.

Name and address of the person who shot it.—William Lister, joiner, late of Eskdale, now in Australia.

Name of its present possessor.—Mr. Harrison, ironmonger, Strand Street, Whitehaven.

Details of the circumstances under which it was obtained.—First seen in company with peregrine falcons, by a man named Graham: about two weeks afterwards Lister discovered its roosting-place, and made several ineffectual attempts to shoot it: he then fixed his gun into a wall (the dry boulder sheep-walls of the district), and thus *covered* the eyrie, situated in a crevice of a crag; returning at midnight he discharged his gun, and on the following morning found his shot had told: yes—with all due regard for the opinions of others on the aids to and furtherance of science, and the requirements of collectors, I venture to regret—it had told too well, since, although of extremely rare occurrence, it is very possible there may be others in the country with which it might have mated.

I was lately informed by a military gentleman—a crack shot, and well acquainted with native birds, yet no collector, and who long resided with his regiment in Canada —that a few years ago he rarely, for a long period, took his morning walk without seeing a specimen of the swallow-tailed kite, and in this immediate neighbourhood: he described its peculiar flight, and was certain of its identity. I am also credibly informed that a ship captain brought a pair alive from New Orleans to Liverpool, at a much later date than the above, but I am unable to state what became of them. With respect to the birds inquired about, they certainly are not so common as to be of every-day occurrence in chosen localities, yet that they may be procured at intervals here and there is a fact pretty well known to many collectors. During the severe weather of last winter, the little gull and many other northern sea-birds were frequently seen about St. Bees' Head: the merganser was shot on Ennerdale Lake. Two specimens of the little bittern have been shot in this neighbourhood lately. A month ago a swan passed southward over this town, flying very low. I now have to record a visitor perhaps quite as rare in this district as the Elanus. A specimen of the great bustard was killed lately near Wigton, and, although without details at present, I have most excellent authority for its truth, and believe it the only instance on record of this bird having been seen in Cumberland. In conclusion, I have to remark, that for the circumstances, names, &c., relating to the capture of the Elanus, I am indebted to the possessor, who refers me to Yarrell for a correct detailed description of the bird. —*Joseph Robson; Whitehaven, July* 17, 1854.

Occurrence of the Honey Buzzard (Falco apivorus) *in Norfolk and Suffolk.*—A fine specimen of this rather scarce bird was shot at Holkham, in Norfolk, on the 4th of July; and about the same time another was obtained near Saxmundham, in the adjoining county. On examination both proved to be females, the first being the oldest bird, having attained the ash-gray plumage on the head, often described as a variety under the name of the "capped buzzard." The stomachs of both these birds were well filled with young wasps, in different stages of growth, and in that of the Suffolk specimen a few pieces of moss, which had no doubt been accidentally swallowed during the destruction of the wasps' nest.—*H. Stevenson; Norwich, July* 12, 1854.

Note on a Bustard killed in Cumberland.—A very fine female of the great bustard (*Otis tarda*) was shot on the 8th of March last, in a turnip-field, at Leeshill, parish of Lanercost, Cumberland, and is now in the possession of Mr. Joseph Mowbray, innkeeper, Brampton. It is said to have been in good condition, and weighed 11 ℔s.—*Thomas John Bold; Angas' Court, Bigg Market, Newcastle-on-Tyne, July* 3, 1854.

Note on the late appearance of the Common Scoter (Anas nigra) *in Norfolk.*—Under a similar heading (Zool. 3989), I recorded the occurrence of three specimens of this bird unusually late in the season, the last being on the 20th of June, 1853. A few days since I saw in the flesh a young male, shot on the Norwich river, near Surlingham, on the 1st of this month: this bird was just beginning to assume the dark plumage of the adult male, and would, I should think, agree with the occasional stragglers seen, according to Yarrell, between June and July, outside the rocks of the Isle of White and in Christchurch Bay, supposed by him to be birds "only 12 or 14 months old, that would remain unable to breed till the following summer."—*H. Stevenson; Norwich, July* 10, 1854.

Occurrence of Larus Sabinei, Leach, *in Sussex.*—During the severe frost in December, 1853, a specimen of this bird, apparently near the completion of its second year, was shot at Newhaven, Sussex, by the gardener of Mr. Catt, of the Tide Mills, near that town. I examined it very carefully, and found it to agree closely with the description by Mr. Thompson, quoted by Mr. Yarrell in his 'History of British Birds,' vol. iii. p. 425. It is now in the possession of Mr. Wm. Catt, of Brighton. The measurement was as follows:—

	in.	lin.
Length from tip of bill to tip of longest tail-feather	12	10
" " to centre of fork of tail	11	0
" from carpus to end of wing	10	5
" from tip of bill to feathers above nostrils	0	10
" " to gape	$1\frac{1}{8}$	
" of naked part of tibia	0	7
" of tarsus	1	2
" of middle toe, with claw	$1\frac{1}{20}$	
" of claw of middle toe	0	1
Depth of fork of tail	1	0
Extent of wing beyond longest tail-feathers	1	4

—*Wm. Borrer, jun.; Cowfold, Sussex, July* 7, 1854.

Occurrence of the Continental White Wagtail (Motacilla alba) *in Sussex.*—A male and a female of this species were shot on the 6th of April last, near the Chalybeate, in the parish of Hove, near Brighton, and brought to me by G. Swaysland, of Cranbourne Street, Brighton, before they were skinned: he told me that he shot them near some ploughed land, that they did not follow the plough like M. Yarrellii, that they were much wilder, and that they had a hoarser note. On the 8th, another bird-preserver, H. Pratt, of Queen's Gardens, Brighton, brought me a female, a last year's bird, also in the flesh, which he had shot near the same place, on the same day; and on examination of this specimen I found that the eggs were only just formed, or at least showed but slight development. Swaysland has told me that that was the state also of the ova in his specimen. On reference to my note in the 'Zoologist,' (Zool. 3908), I find the same observation respecting a specimen obtained still later in the year, April 19, 1853. In the male specimen obtained by Swaysland, in April of the present year, is a curious malformation, there being on one foot two perfectly formed and very nearly similar hind toes: the other foot is as usual. I have little doubt, as the bird is now known, that this species will be found to be a regular summer visitant to our South coast.—*Id.*

Observations on the Nidification of Gasterosteus aculeatus and Gasterosteus spinachia. By ALBANY HANCOCK.*

IT is only within the last few years that naturalists have clearly determined that some species of fish make nests for the reception of their spawn, though Aristotle was actually acquainted with the fact about twenty-two centuries ago.

Five or six kinds are now ascertained to nidify; and of these, two belong to the genus Gasterosteus; one, G. aculeatus, the three-spined stickleback,—the other, G. spinachia, the fifteen-spined stickleback. The former is a well-known, active, and pugnacious little fish, inhabiting almost every pool and rivulet in the kingdom; the latter is much rarer, and is a denizen of the sea.

Mr. Jonathan Couch states, in his interesting work entitled 'Illustrations of Instinct,' that the first detailed notice of the nest-building of the three-spined stickleback occurs in a little magazine 'The Youth's Instructor,' for the year 1834. This notice is from the pen of Mr. T. Crookenden, a gentleman unknown as a naturalist, but who has given a very faithful account, so far as it goes, of the nidification of this species. It contains all that is at present known on the subject, and its accuracy can be verified by any one who will take the trouble to look into almost any pool of water during the summer months,—the breeding-season of the stickleback. At this time these fish will be observed near to the margins, busily engaged in building and guarding their nests; and shoals of the fry may be seen, in different stages of development, swimming about in all directions. But if we wish to study, to advantage, the nidification of this species, a few specimens should be placed in confinement about May or June, and then all their movements can be narrowly watched and accurately observed. Care must be taken, however, that they be left unmolested, and that their new abode resemble, as much as possible, their usual haunts. I have lately had an opportunity of noticing the habits of this fish, during the breeding-season, under the above favourable conditions.

We have, for some time past, kept a glass trough filled with aquatic plants and animals: the bottom of this vessel is covered with mud, and the rock-work, piled up in the centre, is overgrown with a delicate hair-like Conferva; a few floating plants spread over the surface of the water, and innumerable Entomostraca, and other small Crustaceans, as well as various animalcules, swarm in all parts; the minute, but deadly, poison-armed Hydra also prevails where food is so plentiful; and a solitary individual of the great water-beetle (*Dytiscus marginalis*) rambles over its watery domain, lord and master of all. Several of the fresh-water Mollusca also people the trough, which on the whole has much the appearance of a miniature pond. Into this new home were put four or five sticklebacks last May, and they at once made themselves perfectly at ease. One, without the least hesitation, took possession of a certain spot, which it guarded with the greatest pertinacity, attacking vigorously any of its companions that might happen to approach the chosen locality. The beetle too, which sometimes came slowly paddling by, was pounced upon and unceremoniously tumbled over; but secure within his scaly armour, as the knights of old, he little heeded the onslaught of his naked assailant; so, overpowering all opposition, he scrambled onward in his undeviating path.

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* Extracted from the 'Transactions of the Tyneside Naturalists' Field Club,' vol. ii. p. 311.

This fish was rather small, had the throat of a bright red colour, and the eyes of a brilliant bluish green. At first, all the others were pale; but in the course of a few days, one of them gradually assumed the rich hues of that just described, and soon afterwards it also became attached to a spot, taking up its abode in one of the corners of the trough. On examining attentively the two selected localities, a nest was found in each, composed of a collection of delicate vegetable fibres, resting on the bottom of the trough, and matted into an irregularly circular mass, somewhat depressed, and upwards of an inch in diameter; the top being covered over with the same materials, and having in the centre a large hole. The fishes scarcely ever strayed from their nests, but were constantly on guard, defending or repairing them; they were perpetually prying into the hole at the top, and thrusting their heads right into it. On one occasion, one of them entered by this hole, and slowly forced itself right through the side of the nest; as it gradually moved onwards, its body had a peculiar lateral vibratile motion. They would frequently seize hold of the nest and give it a violent tug, shaking and tearing loose the vegetable matter of which it was composed; at other times they would carry to it, in their mouths, fine Conferva-stems, and press them with considerable force into the walls of the nest, or thrust them into the hole, which by this means was sometimes partially concealed. Occasionally, each was observed hovering over its nest, with the head close to the orifice, the body being inclined upwards, at an angle of about 45°, fanning it with the pectoral fins, aided by a lateral motion of the tail. This curious manœuvre was apparently for the purpose, so to speak, of ventilating the spawn, which could be distinctly seen through the orifice at the top; at least, by this means, a current of water was made to set in towards the nest, as was rendered perfectly evident by the agitation of particles of matter attached to it. This fanning or ventilating process was repeated, at short intervals, during the day, and every day until the spawn was hatched, to accomplish which took between two and three weeks.

Only one nest contained spawn; the other was torn in pieces, and the materials scattered about, in the hope that we might have the pleasure of seeing it reconstructed. In this we were not disappointed; the fish immediately began to form a new nest in exactly the same spot, and by the following day it was more than half completed. It took a mouthful at a time, and was at some pains in adjusting each load, spreading the materials out, and pressing them down with its mouth; it then drew its body slowly over the whole, vibrating, all the time, in the same peculiar manner as when it forced its way through the nest as before stated.*

On the 13th of June, the hole at the top of the fruitful nest was found to be much enlarged, so that the entire mass of spawn was exposed to view; and, on looking attentively, a few of the newly hatched fry were seen flitting about the walls of the nest. The assiduity of the parent was now greatly increased; it never left the spot; by night it rested either on the nest or by its side, and during day nothing was allowed to approach. It fiercely seized a quill that was passed down towards the object of its solicitude, with such vigour that the shock of attack was distinctly felt by the hand. Combats with its companions became more frequent; but its ire was chiefly directed against its neighbour, which, like itself, was engaged in parental duties. This having also a nest to defend, never shrank from the conflict, and the encounters were therefore fierce and prolonged; but, nevertheless, conducted with all due caution, and apparently with much science, as the gentlemen of the ring would express it. The sparring was very wary, and generally lasted a few seconds before the combatants closed. The attack was usually commenced by one quietly creeping up, watching its opportunity; on this the other, acting on the defensive, would turn its broad side to the enemy, and, raising the ventral spine, wait to receive the onslaught; the assailant, intimidated by this formidable demonstration, would then slowly retreat, and in its turn had in the same manner to defend itself. After thus advancing and retreating for a few times, one, taking advantage of an unguarded moment, would rush in upon its opponent and butt at it with its head, apparently endeavouring to bite; the other, rallying, returned the compliment, and after dashing at each other in this way two or three times, with extraordinary rapidity, the round would terminate, and each fish retreat to its nest, to recommence its more immediate nidimental duties.

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* It is probable that it is the male fish which builds and guards the nest; and, if so, it might perhaps be shedding the milt when dragging its body over and through the nest in the manner described.

The fry were at first so minute and transparent that they could scarcely be discerned as they lay partially concealed amid the meshes of the nest: every now and then a slight fluttering motion betrayed their position, otherwise it was almost impossible to distinguish them. As I was closely watching their motions at this time, one of the newly hatched fishlings, with intrepidity beyond its experience, ventured to pass the limits of its cradle: in an instant the watchful parent was there, and with gaping mouth seized the little wanderer, which immediately disappeared, the jaws having closed upon it. Seeing this, I at once gave up the fry for lost, deeming that here was an instance of instinct at fault, and that all the affectionate solicitude of the parent was to end in its devouring its offspring. In this I was mistaken: the old fish, quietly returning, dropped the straggler into its nest lively and uninjured. During the whole of this day none of the fry were permitted to ramble beyond the precincts of their fold; when any attempted to do so—and many did attempt—they were invariably brought back in the mouth of the parent: none escaped its vigilant eye, and it was amusing to see with what a hurried, fluttering motion the little things dropped almost perpendicularly down into the nest, so soon as they were released from the jaws of the parent.

It was three days before all the eggs were hatched, and the attention of the parent, during all this time, was unremitting. On the second day I marked its manœuvres for five minutes, and found that, in this short period, it ventilated the nest eight times, warded off an attack of the neighbouring fish, and brought back to the nest a straggler or two. During this day the spawn was frequently examined by the parent, who would occasionally seize hold of it and give it a good shake; apparently for the purpose of throwing off adherent matter, that the water might freely circulate about the eggs. The parent would then dive head foremost into the nest, and bring out a mouthful of mud, which it would carry to some little distance and discharge with a puff.

The third day was passed much in the same manner, only as the eggs were now all hatched, the nest was less frequently fanned or ventilated; and the fry, about forty in number, were allowed greater liberty, the strongest being permitted to recreate themselves among the Confervæ that grew on a stone about 2 inches from the nest. On the fourth day the fanning had ceased altogether, and the rambles of the young were less restricted. They were not yet, however, permitted to pass beyond certain limits; when any transgressed these bounds they were immediately seized, as heretofore, and carried back to the nest, into which they were always very glad to escape from the clutches of their ardent parent. Notwithstanding all her vigilance, one contrived, on the fifth day, to escape her eye, and passing he fatal boundary was immediately devoured by the other fish, which now seemed always on the watch, neglecting its own barren nest, being intent only on appropriating to itself the nestlings of its fruitful neighbour. In this act of cannabalism we see the reason for the parent's anxious care and its jealousness of its kind; and it is evident from Mr. Crookenden's account, previously quoted, that they greedily devour each other's spawn. The young fry, however, have other enemies as well as their own species. One day a favourite Hydra, H. fusca, was observed to be distended in a most extraordinary manner; on examination, it was found to have swallowed the head and shoulders of one of the young fish many times larger than itself, and the caudal extremity, which was too much for it, and which was projecting out of its mouth, had been seized upon by another Hydra. Thus, it would appear that these low organized, but powerful and voracious animals, occasionally regale themselves on the flesh of the Vertebrata. This happened when the fry were three or four weeks old.

All the old fish, with the exception of that with the young, were, in consequence of their cannibal propensities, turned out of the trough; and danger being thus removed, the fry were no longer restricted in their rambles, but enjoyed the whole range of their crystal abode. Henceforth the parent's assiduity gradually relaxed, though for days afterwards it was its custom to take the young occasionally into its mouth, and after carrying them a little distance to let them drop out again. I took one of the fry out one day for examination with the microscope; on returning it to the trough, it was in so sickly a state as to be scarcely able to leave the vessel, which was held in the hand. The old fish, perceiving the helpless condition of its offspring, came up to the surface of the water, and seizing hold of the exhausted young one carried it off almost from amidst my fingers, and taking it to some distance puffed it out of its mouth into a tuft of Confervæ. This courageous act of our little fish would seem, in some measure, to give credence to the assertion, so frequently made, that some of the sharks protect their young by receiving them into the mouth on the approach of danger.

Other facts might be related evincing parental attachment; but perhaps enough has been said to satisfy those who take an interest in such matters that in this respect the three-spined stickleback is scarcely, if at all, inferior to the hen, whose affectionate regard for her offspring has ever been the theme of admiration. Incubation, with the fish, is out of the question; it attends its nest, however, as diligently as any of the feathered tribes, keeping it in constant repair, fanning it with its fins, and removing anything that might obstruct the free action of the water upon the eggs; it defends its young with the same undaunted courage, and though it cannot gather them under spreading wings as the hen gathers her brood, yet all those which stray are brought back to the nest, that they may be under the protection of their ever-vigilant and courageous parent.

The nest of the fifteen-spined stickleback (*Gasterosteus spinachia*) was first noticed by Mr. Jonathan Couch, on the Cornish coast, in 1842. Since then it has been observed two or three times on the coast of Northumberland. It is composed of pendant sea-weeds bound together, by a silk-like thread, into pear-shaped or fusiform masses: the spawn is deposited in the centre of the mass. Mr. Couch says, " One of these nests was visited every day for three weeks, and the old fish was found invariably guarding it: it would examine the nest on all sides, and then retire for a short time, but soon return to renew the examination. On several occasions," continues this gentleman, " I laid the eggs bare by removing a portion of the nest, but when this was discovered great exertions were instantly made to recover them. By the mouth of the fish, the edges of the opening were again drawn together, and the other portions torn from their attachments and brought over the orifice till the ova were again hid from view: and as great force was sometimes necessary to effect this, the fish would thrust its snout into the nest, as far as the eyes, and then jerk backwards till the object was effected. While thus engaged, it would suffer itself to be taken in the hand, but repelled any attack made on the nest, and quitted not its post so long as I remained."

Mr. Richard Howse, who found three or four of these nests in a pool among the rocks at Tynemouth, a year or two ago, informs me that each was attended by a fish, and that they scarcely ever left their nests, but kept hovering about, attentively examining them, and thrusting their projecting muzzles amidst the sea-weeds of which they were composed; the fish would occasionally poise themselves close to the nest, and fan them with the pectoral fins in the same manner as the three-spined species. And, indeed, it is quite evident, from the accounts given by these two gentlemen, that the habits of both species, in all that concerns nidification, perfectly coincide; both guard the nest with the same unwearied perseverance, drive off enemies, make all necessary repairs, fan or ventilate the nest, and keep it in all respects in good order.

It is satisfactory to observe this exact similarity of habits, for Mr. Couch has changed his opinion, apparently upon insufficient grounds, respecting the nest, which he attributed to the fifteen-spined stickleback. He now considers it to belong to the common shanny *(Blennius pholis)*, arriving at this conclusion after having examined the young hatched from ova taken out of one of the nests. "Being from the first," says this gentleman, "impressed with the conviction that they were the young of the fifteen-spined stickleback, I was much surprised to notice the great difference of their shape from that of their supposed parent, more especially in the parts before the eyes, which, instead of being elongated and slender, were short and round. In consequence of this, they were closely examined with glasses, and drawn with the aid of a microscope of low power; and, though I failed to detect satisfactorily the ventral fins of that fish, (chiefly perhaps from their slender form and transparency), yet, from the declivity of the head, protuberance of the belly, the pectoral fin, and the length of the dorsal and anal fins, which in some specimens were continuous with the caudal, and in others separated by a slight notch, I had no hesitation in referring them to the common shanny."

Now, the young of the three-spined stickleback differ just as widely from the mature fish as the young of the fifteen-spined species are stated to do; and, what is of still more importance, the differences are of exactly the same kind. In the former, as well as in the latter, the parts before the eyes are short and round, and can scarcely be said to project at all in front; the declivity of the head is consequently great; the belly is protuberant, and the dorsal and anal fins are long and continuous with the caudal. The young of the three-spined stickleback would therefore appear also to possess, at first, the characters of the shanny; but as development goes on the jaws are pushed out, the belly is reduced in comparative size, and the dorsal and anal fins are shortened, and become ultimately separated from the caudal. Thus, in course of time, the young gradually assume the form and characters of the parent. And there can be little doubt that this would have been found to be the case with the young of the fifteen-spined stickleback, had Mr. Couch watched their development a little longer. The obtuse form of the head, on which that gentleman places much stress, is the embryonic condition of all fishes; the elongation of the jaws is always an after-development.

In conclusion, it may be remarked, that of the three or four other species of fish described to nidify, one, a native of Demerara, is stated to remain by the side of the nest with as much solicitude as the hen guards her eggs; the same is said respecting another species inhabiting the Black Sea: but in none, so far as I am aware, has parental attachment been observed to equal that evinced by the three-spined stickleback. Yet we must not, therefore, conclude that it does not exist to the same extent in others of the finny tribes. The habits of these animals are very little known; and who can say what time may bring to light respecting the economy of the inhabitants of the deeper regions of the sea! It is only, as it were, the other day that nothing was known of the nidification of the three-spined stickleback,—a resident of almost every pool, river and rivulet in the kingdom.

P.S.—Since the above paper was read, I find I am wrong in assuming that Mr. J. Couch is the author of the Memoir on the Nidification of the Fifteen-spined Stickleback, which was published in the Transactions of the Royal Institution of Cornwall: this Memoir is, I am informed, from the pen of Mr. R. Q. Couch, Not being able to refer to these Transactions, I quoted from the 'Illustrations of Instinct,' the work of the former gentleman, and in it the author's name of the communication in question is not given. Mr. R. Q. Couch has assured me that he still entertains the opinion he originally expressed, that the nest described by him really belongs to the fifteen-spined stickleback.

I have also recently ascertained that, so far back as 1839, Dr. Johnston described the nest of this fish, in the Transactions of the Berwickshire Naturalists' Club. In the Doctor's communication it is stated that "In an early volume of the 'Edinburgh Philosophical Journal' there is a slight notice of fishes' nests found on the coast of Berwickshire, by Admiral Milne; but the species of fish, by whom they are constructed, is not mentioned." And it is further stated that "Mr. Duncan, of Eyemouth, has ascertained that they belong to the fifteen-spined stickleback, a fact confirmed by the Rev. Mr. Turnbull, to whom the Club is indebted for specimens." The nest and habits of the fish are then accurately described; and in a concluding note it is announced that Mr. Maclaren, of Coldinghame, had seen and watched the stickleback in the act of making the nests.

It would therefore appear that the credit is due to these gentlemen, not only of publishing the first observations on this interesting subject, but also of determining the fact that these nests belong to the fifteen-spined stickleback.

A few Remarks on the Pulsations of some of the Land Mollusks.

By J. W. Watson, Esq.

Having been engaged a little in the examination of the internal structure of some of the mollusks,—chiefly the Limaces, as being easier to dissect than most,—and having unexpectedly become cognisant of one or two facts respecting them, I thought it might not be out of place to record some of these observations in the 'Zoologist,' for I feel assured, from the papers on various subjects which appear in it from time to time, that its contributors, and, as a matter of course, its readers, do not confine themselves to the mere collection of specimens, but aim at something higher.

It is very pleasing to observe that the study of land and fresh-water shells has become much more general than it was a few years ago, particularly amongst young people; and though they are most of them small and insignificant in appearance, requiring very diligent search in order to discover them, there is something very interesting even in their outward form, of which there is considerable variety, from the spirally twisted Clausilia to the disk-like Zonites; and, in size too, only compare the huge Helix Pomatia with his pigmy brother H. pygmæa! When, however, we extend our inquiries to their inhabitants, observing their habits and investigating their physiology, we at once raise the study to a rank on a par with that of Zoology, Entomology, or any other branch of Natural History. That to which I would invite the attention of the readers of the 'Zoologist' is the circulating system of the mollusks. Perhaps in none can it be better observed than in the common slug (*Limax maximus*), from his large size: he is provided, as is every other land mollusk, with a breathing-hole, into which, at irregular intervals, air is admitted, though it continues for the most part open, when the animal is in motion, closing instantly if the smallest breath of air comes against it. This opening discloses wonders when closely examined; the cavity to which the breathing-hole opens extends right through the upper part of the body, beneath the mantle to the skin on the other side. Within this may be seen part of the pulmonary vessels, the greater portion of the heart, and a sac containing the arteries, through which the semitransparent blood is poured to all parts of the body. The arterial sac is furthest removed from the opening, and shows the pulsations in a remarkably beautiful manner; in fact, the arteries themselves may be seen to be slightly darkened by the flow of the blood at every stroke. The number of pulsations in the one I first examined was from 50 to 55 per minute. In front of a portion of this sac is the heart, which is a whitish and almost opaque body, the lungs being spread over the upper part of the cavity, and protected by the flat internal shell. Having been very much interested with the above observations, I was led to make further investigations and experiments on the circulating system of a few of the other commoner mollusks, and the following is the result of some of these investigations.

At a temperature of about 60° or 65° Fahr. the pulsations of Zonites radiatulus are from 50 to 55 per minute; of Z. crystallinus 60 to 65; of Z. parus about 70; of Z. nitidulus 65 to 70; and of Z. alliarius 65 to 70. The pulsations of Helix hybrida, in an immature specimen, were about 90 per minute; the latter, however, was examined when the temperature was about 70° Fahr. This may seem to some to be a useless remark, and may perhaps excite a smile, but let them read on, and I doubt not they will be as much surprised as I was at finding what an effect a small amount of heat has upon the circulation of these seemingly sluggish creatures. Let any one, after watching and counting the pulsations of Z. alliarius at the above temperature, take the same shell into his *hand*, and he will find that the pulsations are very much accelerated almost instantly; in fact, nearly doubled. The pulse of Z. alliarius beats at the rate of 110 per minute. In Z. radiatulus I counted 100 per minute, and similar results were obtained from the rest. From this I was induced to proceed still further, and see what effect the abstraction of heat had upon them: I found it precisely the same as might have been expected from the above results.

By dissolving equal parts of saltpetre and muriate of ammonia in six parts of water, a cooling mixture is made: over this I placed a piece of metallic foil touching the fluid, and upon this laid Z. alliarius: in a very few seconds the pulse began to decrease, until there were only about 30 beats per minute, and these very weak.

It does not require any very close investigation to make these observations, since the beating of the pulse of Z. alliarius is quite evident to the naked eye at the under side of the shell, on account of its transparency, and with a small pocket lens it is very distinct.

Where, in Nature, can we find more marvellous results than these? for by merely increasing the temperature a few degrees, we have the pulse increased to a feverish speed, and by reducing the heat in the same degree there is almost a cessation of its action. The problem of how mollusks exist during their hybernation is solved at once, and in a most satisfactory manner.

J. W. WATSON.

Flounders Institute, Ackworth, near Pontefract,
June 26, 1854.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

July 3, 1854.—EDWARD NEWMAN, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors:—The 'Zoologist' for July; by the Editor. The 'Athenæum' for June; by the Editor. The 'Literary Gazette' for June; by the Editor. The 'Journal of the Society of Arts' for June; by the Society. 'The Natural History Review,' No. 2; by the Editor. 'Monographia Cassididarum,' auctore C. H. Boheman, Holmiæ, 1854; by the Author. 'Hewitson's Exotic Butterflies,' Part 11; by W. W. Saunders, Esq. 'Bibliotheca Historico-Naturalis,' 3 Jahrgang, 1 Heft, 1853; by the Author, Ernst A. Zuchold. Fifty specimens of British Lepidoptera; by T. H. Allis, Esq.

Exhibitions.

Mr. Stevens exhibited a living full-grown larva of Notodonta Carmelita, reared from the egg; a specimen of Pyrochroa pectinicornis, a new British beetle, taken by Mr. Buxton, in Scotland; and Damaster Blaptoides, *Koll.*, from Japan, of which only four specimens were known in Europe.

Mr. Waring exhibited several insects, found dead and covered with a tough film, apparently of a fungoid nature.

Mr. Janson exhibited a box of Lepidoptera and Coleoptera, captured by Mr. Foxcroft, in Scotland; also Drilus flavescens and other insects, taken on the occasion of the Society's excursion to Darenth Wood, on the 17th of June, when the Members present had the pleasure of the company of Herr C. A. Dohrn, President of the Entomological Society of Stettin, and Professor C. H. Boheman, Conservator of the Entomological Museum at Stockholm. He also exhibited six specimens of the scarce Hypulus quercinus, taken on the 8th and 10th of June, at Colney Hatch Wood.

Mr. Stainton exhibited specimens of the new British Anthrocera Minos, taken near Galway, by A. G. More, Esq., by whom they were sent for distribution among the Members.

Mr. Douglas exhibited a new species of Lithocolletis, bred from leaves of Vaccinium Vitis-Idæa sent from Scotland by Mr. Weaver; also Parasia Metzneriella, the larva of which fed in the receptacle of a flower-head of Centaurea nigra.

Mr. Smith exhibited Nomada armata, *Smith*, a bee hitherto exceedingly rare, but which Mr. Dossetor found to be common at Cline Wood, near Swansea, in company with Andrena Hattorfiana. He also exhibited a male of Tenthredo cingulata, this sex being rare, although the female is common in many places; and a new British Crabro,—both taken by Mr. Dossetor, at the above locality.

Carabus intricatus.

Mr. Waterhouse stated that a clergyman, the Rev. Mr. Hore, had lately informed him that he had, at different times, taken in the neighbourhood of Plymouth four specimens of Carabus intricatus,—a species which had been looked upon as a doubtful native.

Nepticula quadrimaculella.

Mr. Stainton called attention to a paper, by Professor Boheman, on Entomological discoveries made during a tour in the South of Sweden, in 1851, published in the Transactions of the Stockholm Academy, containing descriptions of many new species of all Orders, and, among them, a description of the insect taken by Mr. Boyd in the New Forest, and exhibited at the August meeting of this Society last year, which Mr. Stainton thought was Trichopterous, but which Prof. Boheman had, without any remark, placed among the Lepidoptera, under the name of Nepticula 4-maculella.

Nature of the Materials of Wasps' Nests.

Mr. Ingpen said that a microscopic examination of the material of wasps' nests rendered it doubtful if it were made of woody fibre, as was generally believed, for, viewed under a high power, it appeared to be composed of fungoid matter.

Mr. Mark, of Bogota, present as a visitor, said that in South America the wasps collected wood for their nests.

The President stated that Professor Quekett had made a microscopical examination of an anomalous mass taken by Mr. Bree from a rail cut out of the solid wood of an oak, and had pronounced it to be not wood, but fungus.

Genus Amycturus, &c.

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Mr. Waterhouse read a paper entitled "Notes on the Genus Amycturus and allied Genera of Coleoptera, with Descriptions of some new Species."

(Continued from page 4420).

New Species of Paussus.

Mr. Westwood read descriptions of four new Paussi, viz. P. pacificus from Ceylon, P. De Geerii, P. Afzelii, and P. Bohemanii, all from Caffraria; the first communicated for description by Herr Dohrn, the others by Professor Boheman. He also read "Notes on various Insects," by Mr. W. Varney.

New Part of the 'Transactions.'

Part 1, Vol. iii., new series of the 'Transactions,' was on the table.—*J. W. D.*

Correction of an Error.—At page 4129 of the 'Zoologist,' I mentioned Hydrilla caliginosa as occurring on the heaths here; but having since ascertained that I had mistaken another species for caliginosa, I think it but fair to the Entomological world that the mistake should be corrected as publicly as made.—*Octavius Pickard-Cambridge.*

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Mollusks.—A few Remarks on the Pulsations of some of the Land Mollusks, *J. W. Watson, Esq.*, 4417.

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TO CORRESPONDENTS.

Communications still stand over from T. F. Buxton, Esq., J. H. Gurney, Esq., E. C. Taylor, Esq., W. M. E. Milner, Esq., M.P., Rev. Arthur Hussey (the subject of this will have my best attention—*E. N.*), A. G. More, Esq., F. Bates, Esq., and E. C. Buxton, Esq.

The following books have been received for review:—

'The Zoology of the Voyage of H.M.S. Herald.' Part III. Reptiles and Fish. Sir John Richardson. (Reeve.) 10*s.* 6*d.*
'The Sea-Side Book:' Harvey. Third Edition. (Van Voorst.)
'Catalogue of the Coleoptera of Scotland:' Murray. (Blackwood.)
'Geodephaga Britannica:' Dawson. (Van Voorst.)
'Shells and their Inhabitants:' No XIV. Adams. (Van Voorst.) 2*s.* 6*d.*

'The Aquarium:' Gosse. The notice of this unavoidably stands over.

TO ENTOMOLOGISTS.

WANTED to PURCHASE good Specimens of the following LEPIDOPTERA: L. muscerda, O. gonostigma, N. chaonia, N. Dodonæa, P. plumigera, A. strigosa, A. Alni, C. ocularis, N. extrema, T. subsequa, S. ravida, A. saucia, A. lunigera, A. Ripæ, A. cinerea, T. retusa, D. rubiginea, P. dysodea, C. Lychnitis, C. perspicillaris, C. conspicillaris, C. Dipsacea, P. orichalcea, A. luctuosa.

W. GREGSON, Lytham, Lancashire.

EDWARD NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.